US009141652B2

(12) **United States Patent**
Seamon

(10) **Patent No.: US 9,141,652 B2**
(45) **Date of Patent: *Sep. 22, 2015**

(54) **METHOD AND SYSTEM FOR CATEGORIZING ITEMS IN BOTH ACTUAL AND VIRTUAL CATEGORIES**

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(73) Assignee: **eBay Inc.**, San Jose, CA (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

This patent is subject to a terminal disclaimer.

(21) Appl. No.: **13/968,100**

(22) Filed: **Aug. 15, 2013**

(65) **Prior Publication Data**

US 2013/0332492 A1 Dec. 12, 2013

Related U.S. Application Data

(63) Continuation of application No. 13/343,589, filed on Jan. 4, 2012, now Pat. No. 8,549,039, which is a continuation of application No. 12/416,081, filed on Mar. 31, 2009, now Pat. No. 8,117,231, which is a continuation of application No. 09/733,767, filed on Dec. 8, 2000, now Pat. No. 7,523,114.

(60) Provisional application No. 60/199,731, filed on Apr. 24, 2000.

(51) **Int. Cl.**
G06F 17/30 (2006.01)

(52) **U.S. Cl.**
CPC ***G06F 17/30292*** (2013.01); ***G06F 17/30873*** (2013.01); *Y10S 707/99943* (2013.01); *Y10S 707/99945* (2013.01)

(58) **Field of Classification Search**
CPC G06F 17/30873; G06F 17/30973; G06F 17/30598; G06F 17/30601
USPC 707/790–793, 802
See application file for complete search history.

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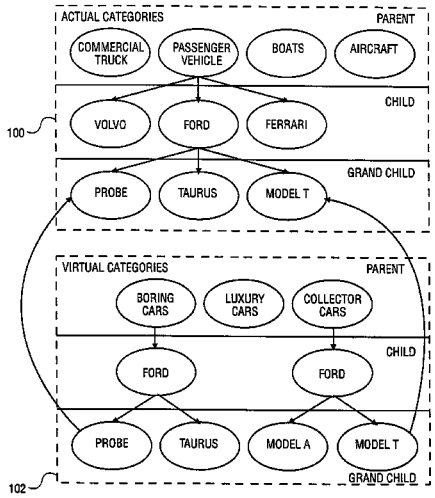
Primary Examiner — Hanh Thai
(74) *Attorney, Agent, or Firm* — Schwegman Lundberg & Woessner, P.A.

(57) **ABSTRACT**

Systems and a method for categorizing items in both actual and virtual categories are described. The method receives a selection that identifies a parent category and a first category based on the parent category. The method further identifies the plurality of data items based on a link from the first category to a second category. The data items are not user-classifiable under the first category and are user-classified under the second category. The method finally communicates a user interface, over a network, that includes the plurality of data items.

20 Claims, 18 Drawing Sheets



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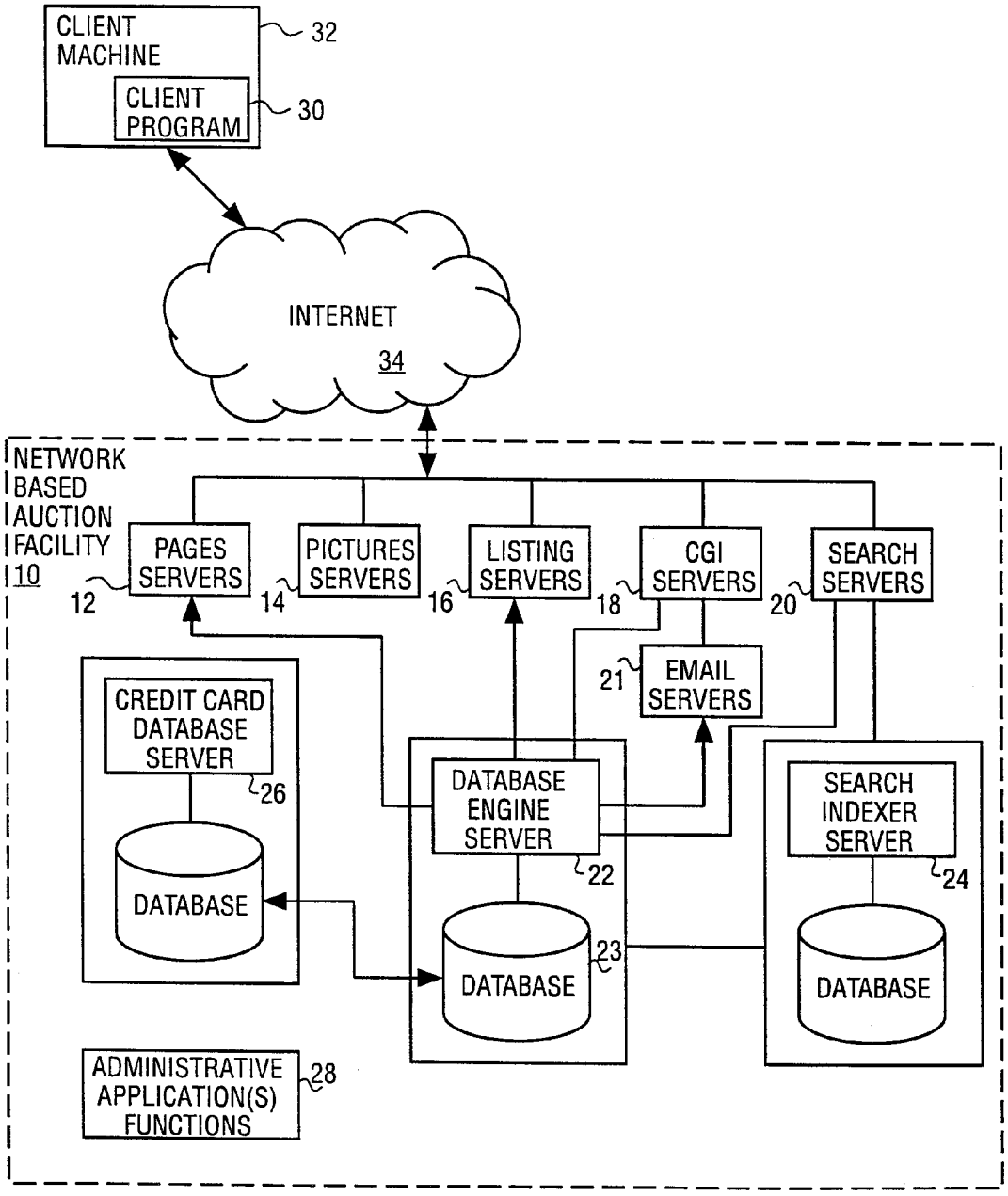
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CLIENT PROGRAM
30
INTERNET
34
NETWORK BASED AUCTION FACILITY
10
PAGES SERVERS
12
PICTURES SERVERS
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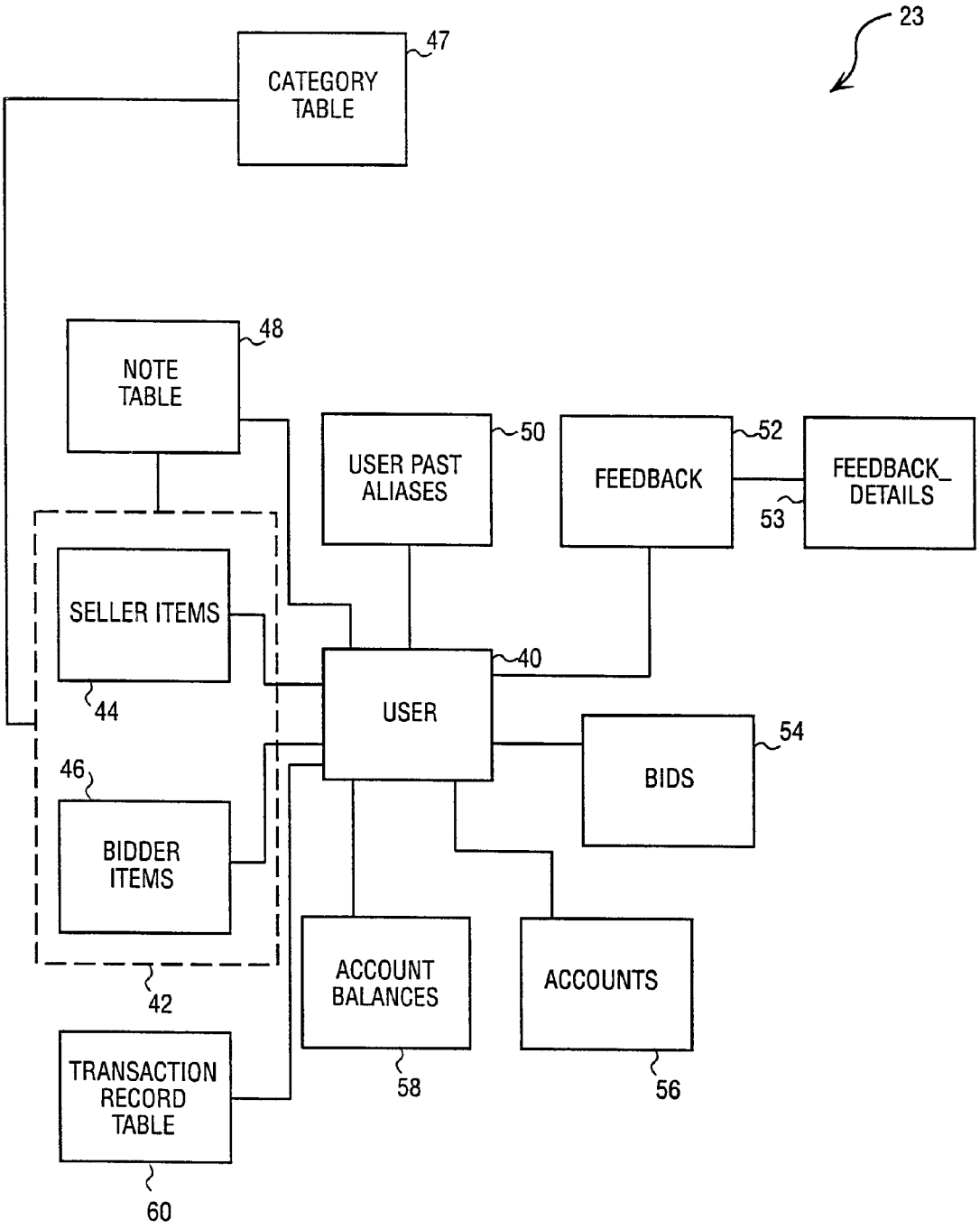
LISTING SERVERS
16
CGI SERVERS
18
SEARCH SERVERS
20
EMAIL SERVERS
21
CREDIT CARD DATABASE SERVER
26
DATABASE
DATABASE ENGINE SERVER
22
DATABASE
23
SEARCH INDEXER SERVER
24
DATABASE
ADMINISTRATIVE APPLICATION(S) FUNCTIONS
28

FIG. 1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CATEGORY TABLE
47
NOTE TABLE
48
USER PAST ALIASES
50
FEEDBACK
52
FEEDBACK_ DETAILS
53
SELLER ITEMS
44
USER
40
BIDS
54
46
BIDDER ITEMS
42
ACCOUNT BALANCES
58
ACCOUNTS
56
TRANSACTION RECORD TABLE
60

FIG. 2

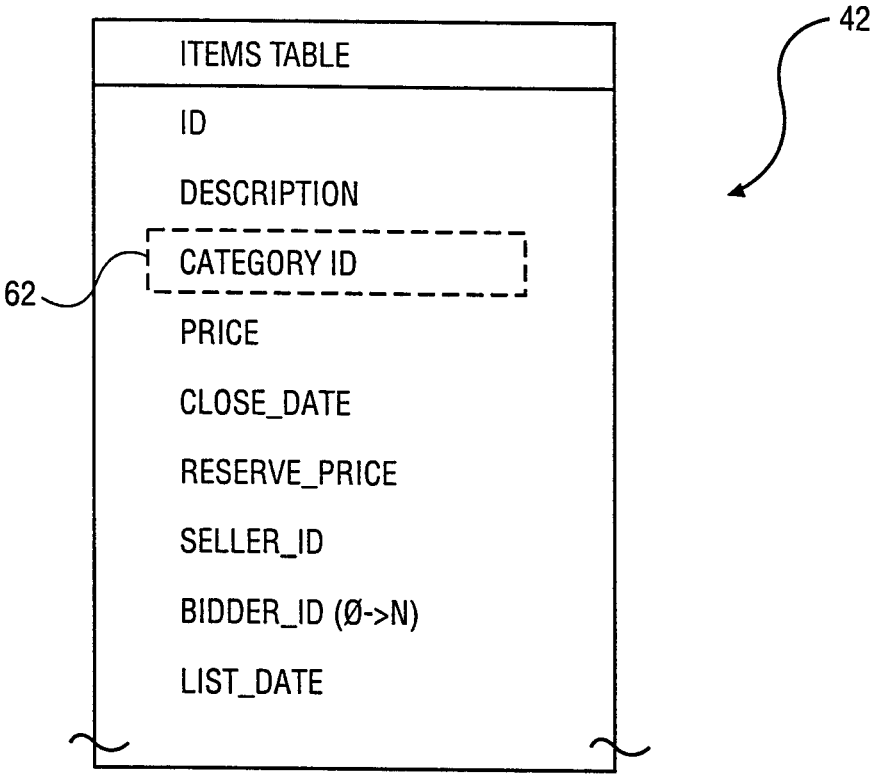
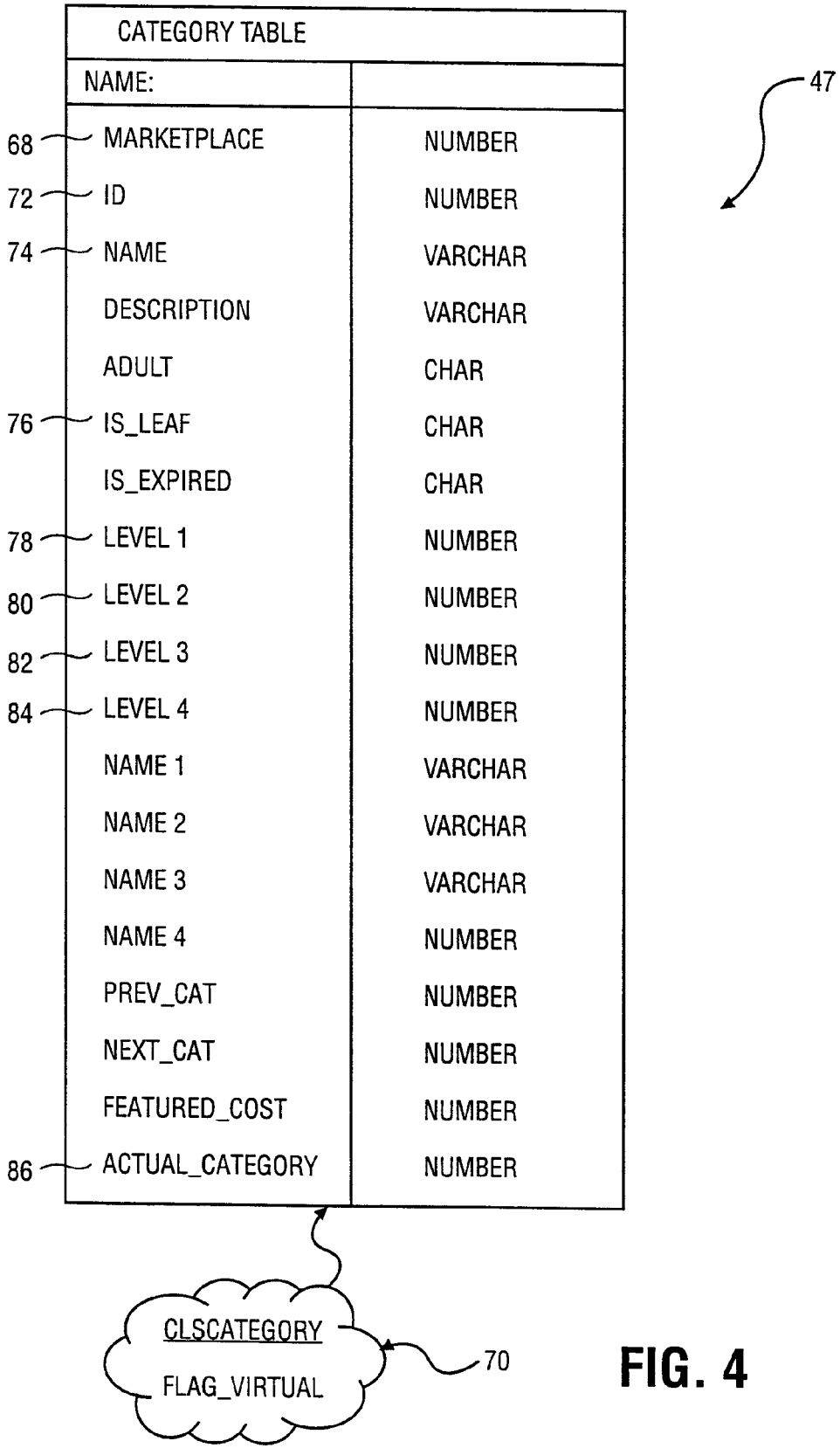

42
ITEMS TABLE
ID
DESCRIPTION
CATEGORY ID
62
PRICE
CLOSE_DATE
RESERVE_PRICE
SELLER_ID
BIDDER_ID (Ø->N)
LIST_DATE

FIG. 3


CATEGORY TABLE
NAME:
47
68
MARKETPLACE
NUMBER
72
ID
NUMBER
74
NAME
VARCHAR
DESCRIPTION
VARCHAR
ADULT
CHAR
76
IS_LEAF
CHAR
IS_EXPIRED
CHAR
78
LEVEL 1
NUMBER
80
LEVEL 2
NUMBER
82
LEVEL 3
NUMBER
84
LEVEL 4
NUMBER
NAME 1
VARCHAR
NAME 2
VARCHAR
NAME 3
VARCHAR
NAME 4
NUMBER
PREV_CAT
NUMBER
NEXT_CAT
NUMBER
FEATURED_COST
NUMBER
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ACTUAL_CATEGORY
NUMBER
CLSCATEGORY
FLAG_VIRTUAL
70

FIG. 4

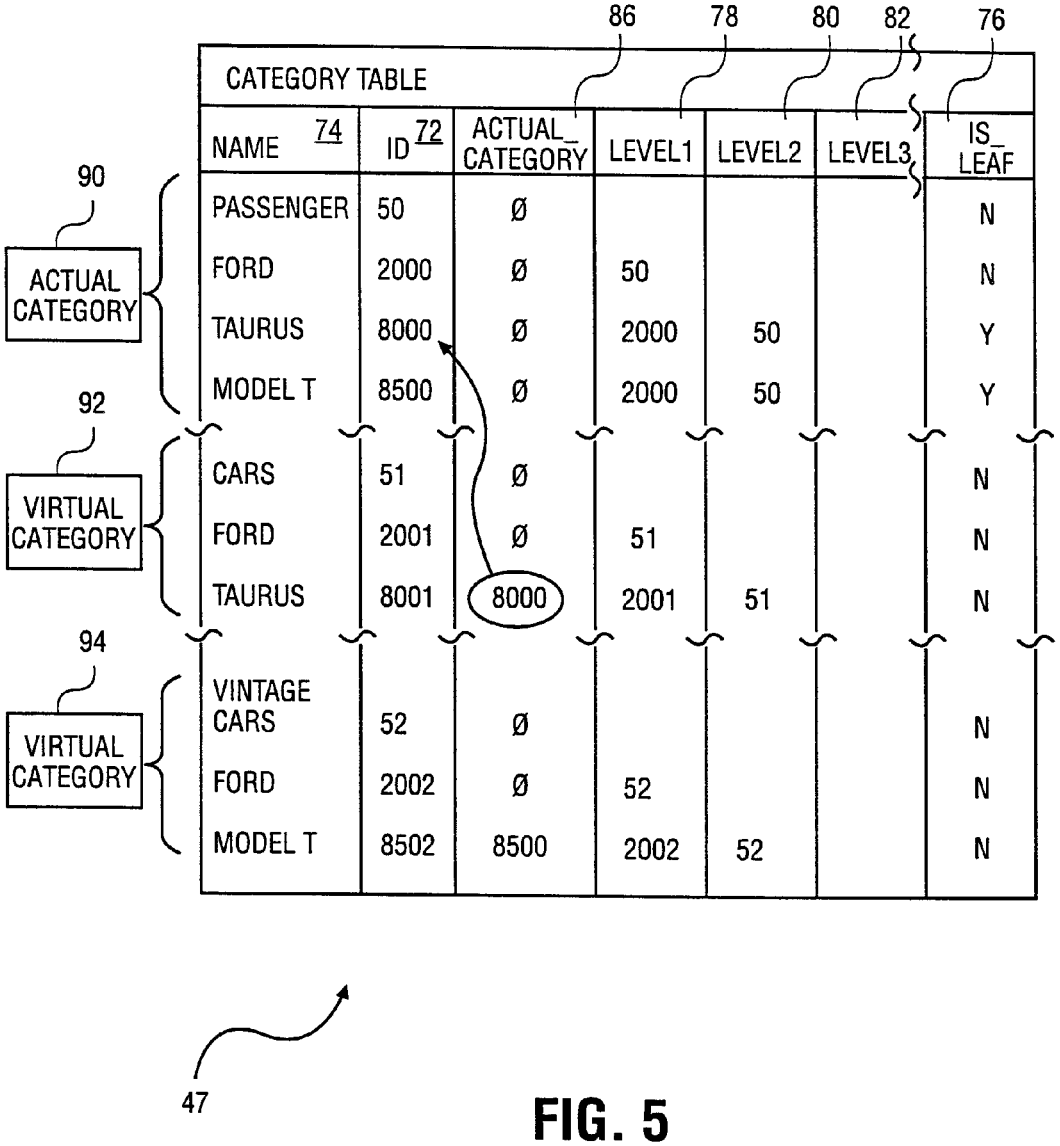

86
78
80
82
76
CATEGORY TABLE
NAME 74
ID 72
ACTUAL_ CATEGORY
LEVEL1
LEVEL2
LEVEL3
IS_ LEAF
90
ACTUAL CATEGORY
PASSENGER 50 Ø N
FORD 2000 Ø 50 N
TAURUS 8000 Ø 2000 50 Y
MODEL T 8500 Ø 2000 50 Y
92
VIRTUAL CATEGORY
CARS 51 Ø N
FORD 2001 Ø 51 N
TAURUS 8001 8000 2001 51 N
94
VIRTUAL CATEGORY
VINTAGE CARS 52 Ø N
FORD 2002 Ø 52 N
MODEL T 8502 8500 2002 52 N
47

FIG. 5

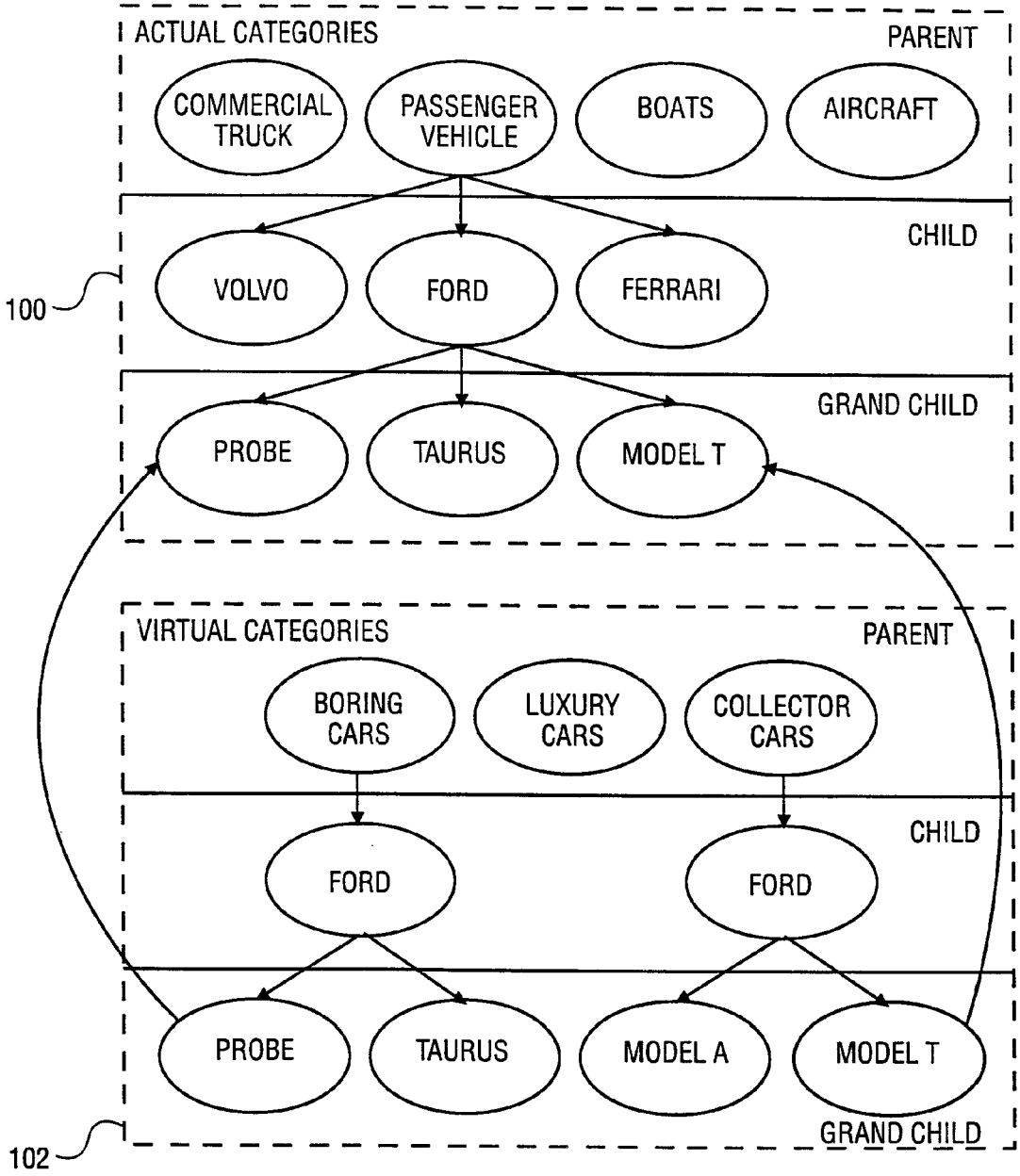

ACTUAL CATEGORIES
PARENT
COMMERCIAL TRUCK
PASSENGER VEHICLE
BOATS
AIRCRAFT
CHILD
VOLVO
FORD
FERRARI
100
GRAND CHILD
PROBE
TAURUS
MODEL T
VIRTUAL CATEGORIES
PARENT
BORING CARS
LUXURY CARS
COLLECTOR CARS
CHILD
FORD
FORD
PROBE
TAURUS
MODEL A
MODEL T
GRAND CHILD
102

FIG. 6

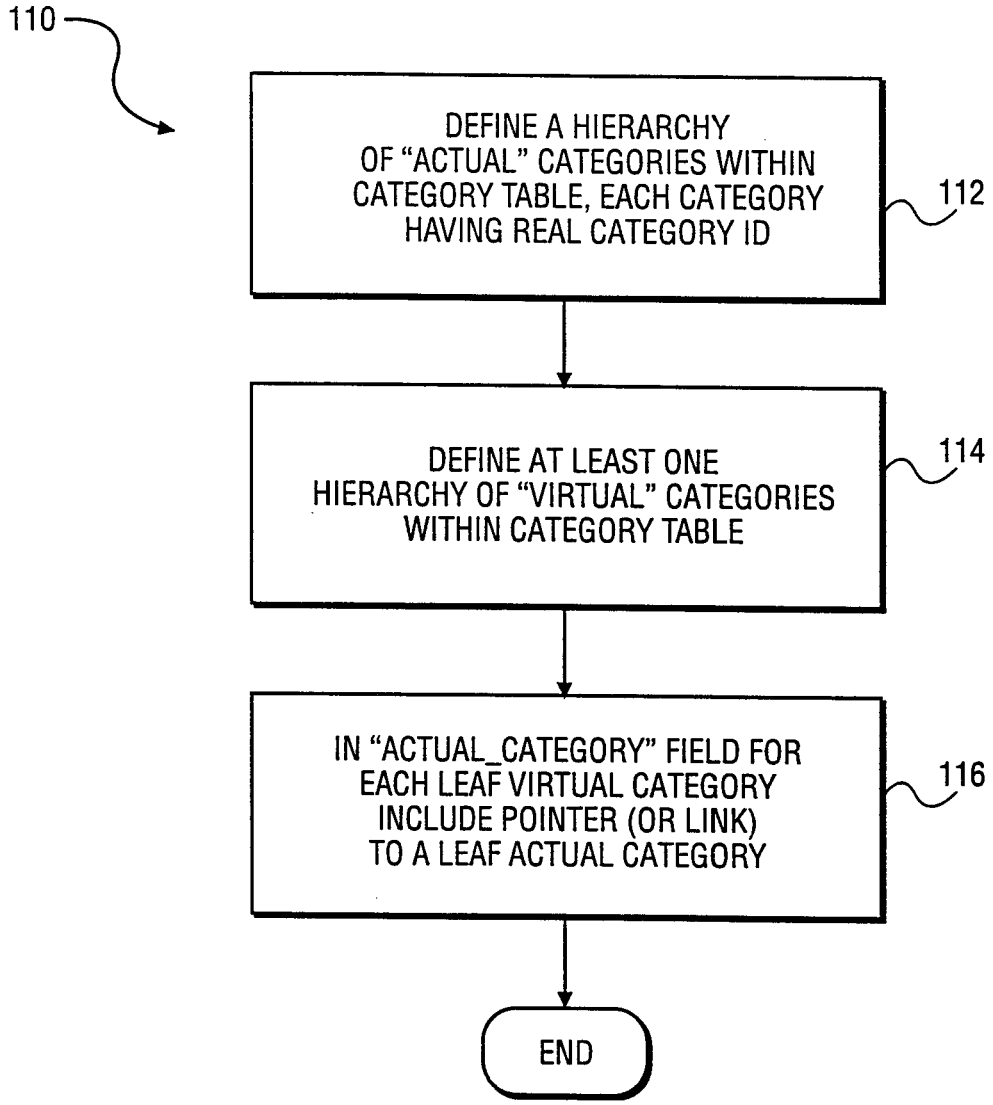

110
DEFINE A HIERARCHY OF "ACTUAL" CATEGORIES WITHIN CATEGORY TABLE, EACH CATEGORY HAVING REAL CATEGORY ID
112
DEFINE AT LEAST ONE HIERARCHY OF "VIRTUAL" CATEGORIES WITHIN CATEGORY TABLE
114
IN "ACTUAL_CATEGORY" FIELD FOR EACH LEAF VIRTUAL CATEGORY INCLUDE POINTER (OR LINK) TO A LEAF ACTUAL CATEGORY
116
END

FIG. 7

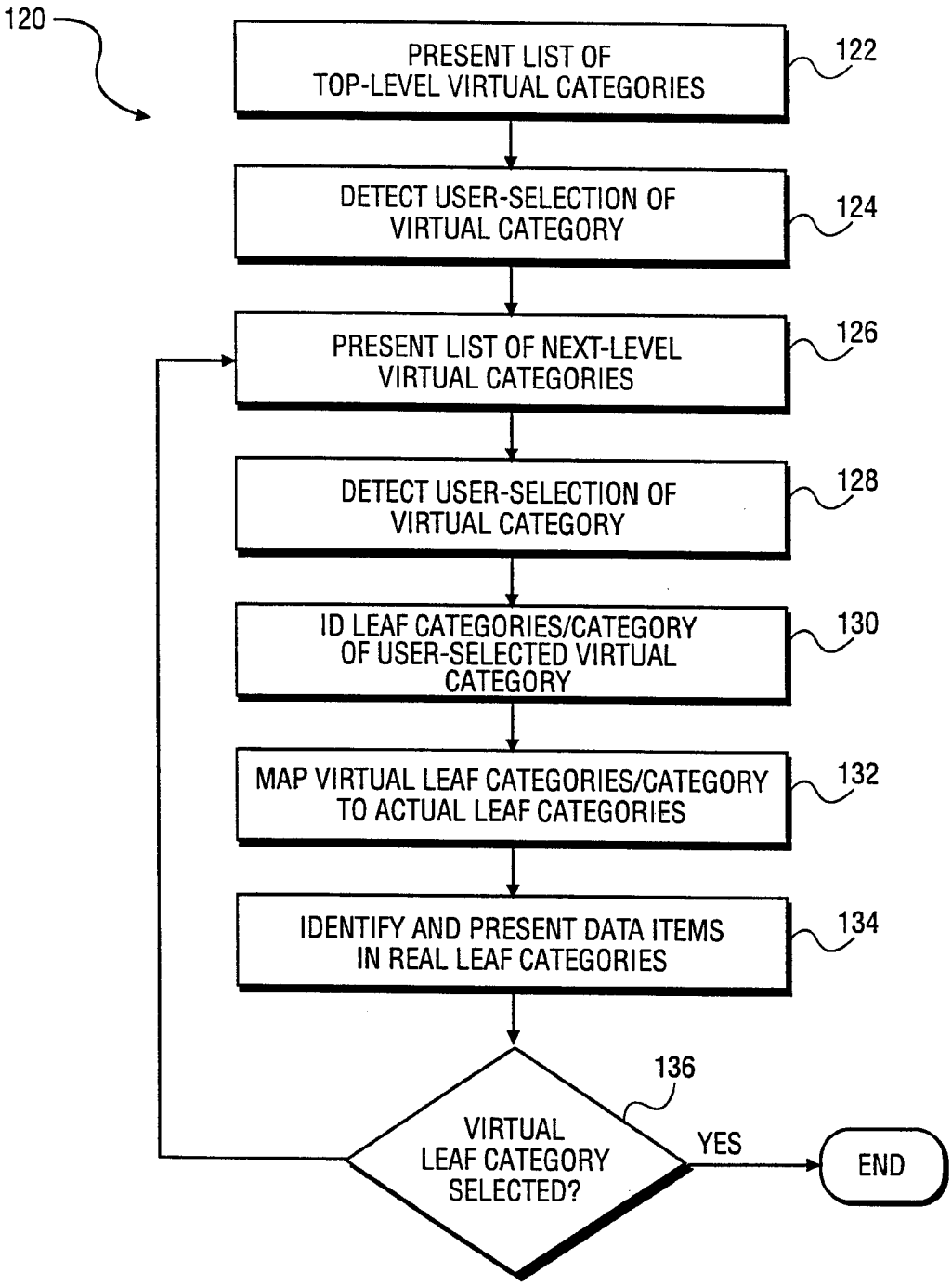
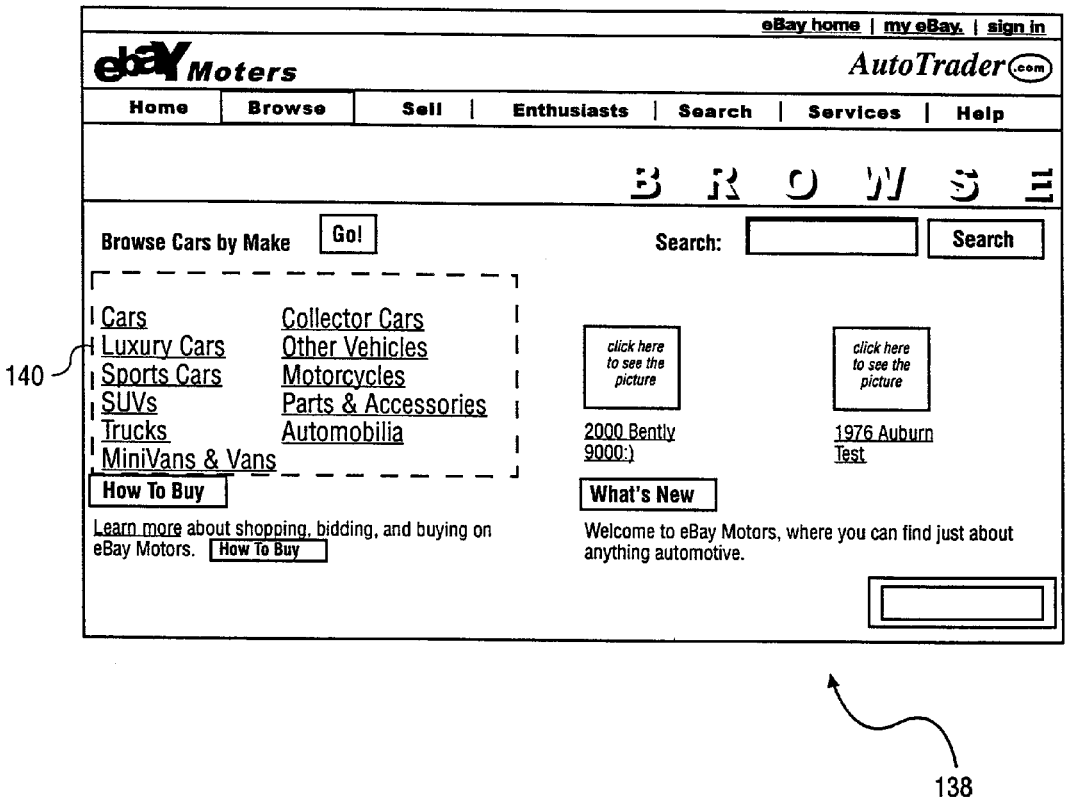

120
PRESENT LIST OF TOP-LEVEL VIRTUAL CATEGORIES
122
DETECT USER-SELECTION OF VIRTUAL CATEGORY
124
PRESENT LIST OF NEXT-LEVEL VIRTUAL CATEGORIES
126
DETECT USER-SELECTION OF VIRTUAL CATEGORY
128
ID LEAF CATEGORIES/CATEGORY OF USER-SELECTED VIRTUAL CATEGORY
130
MAP VIRTUAL LEAF CATEGORIES/CATEGORY TO ACTUAL LEAF CATEGORIES
132
IDENTIFY AND PRESENT DATA ITEMS IN REAL LEAF CATEGORIES
134
136
VIRTUAL LEAF CATEGORY SELECTED?
YES
END

FIG. 8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Home
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Sell
Enthusiasts
Search
Services
Help
BROWSE
Browse Cars by Make
Go!
Search:
Search
Cars
Luxury Cars
Sports Cars
SUVs
Trucks
MiniVans & Vans
Collector Cars
Other Vehicles
Motorcycles
Parts & Accessories
Automobilia
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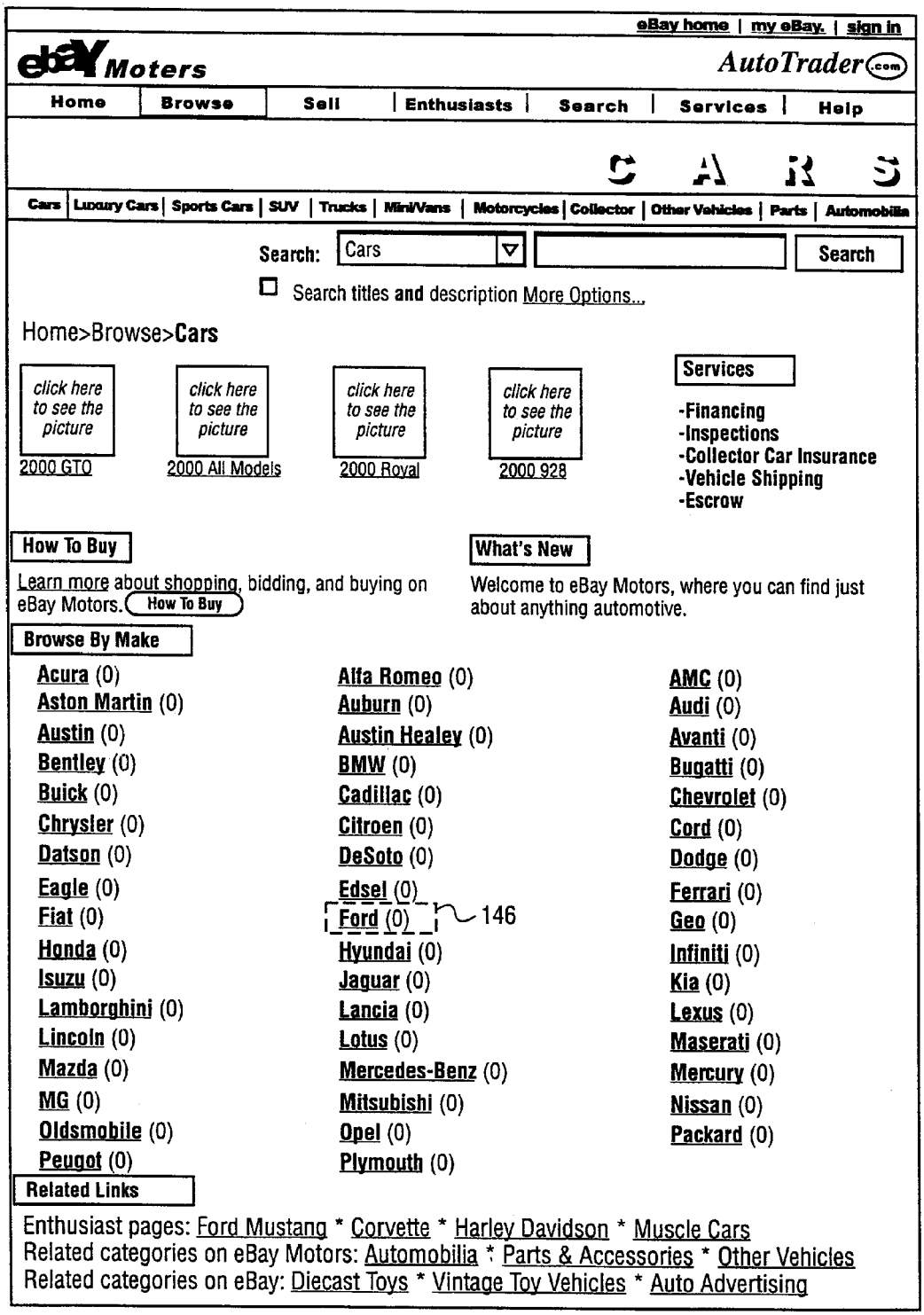
2000 Bently 9000:)
1976 Auburn Test
How To Buy
What's New
Learn more about shopping, bidding, and buying on eBay Motors.
How To Buy
Welcome to eBay Motors, where you can find just about anything automotive.
140
138

FIG. 9A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eBay Motors
AutoTrader.com
Home | Browse | Sell | Enthusiasts | Search | Services | Help
C A R S
Cars | Luxury Cars | Sports Cars | SUV | Trucks | Mini/Vans | Motorcycles | Collector | Other Vehicles | Parts | Automobilia
Search: Cars Search
Search titles and description More Options...
Home>Browse>Cars
click here to see the picture
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click here to see the picture
2000 All Models
click here to see the picture
2000 Royal
click here to see the picture
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Services
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-Inspections
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-Vehicle Shipping
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How To Buy
Learn more about shopping, bidding, and buying on eBay Motors. How To Buy
What's New
Welcome to eBay Motors, where you can find just about anything automotive.
Browse By Make
Acura (0)
Alfa Romeo (0)
AMC (0)
Aston Martin (0)
Auburn (0)
Audi (0)
Austin (0)
Austin Healey (0)
Avanti (0)
Bentley (0)
BMW (0)
Bugatti (0)
Buick (0)
Cadillac (0)
Chevrolet (0)
Chrysler (0)
Citroen (0)
Cord (0)
Datson (0)
DeSoto (0)
Dodge (0)
Eagle (0)
Edsel (0)
Ferrari (0)
Fiat (0)
Ford (0)
146
Geo (0)
Honda (0)
Hyundai (0)
Infiniti (0)
Isuzu (0)
Jaguar (0)
Kia (0)
Lamborghini (0)
Lancia (0)
Lexus (0)
Lincoln (0)
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Mercedes-Benz (0)
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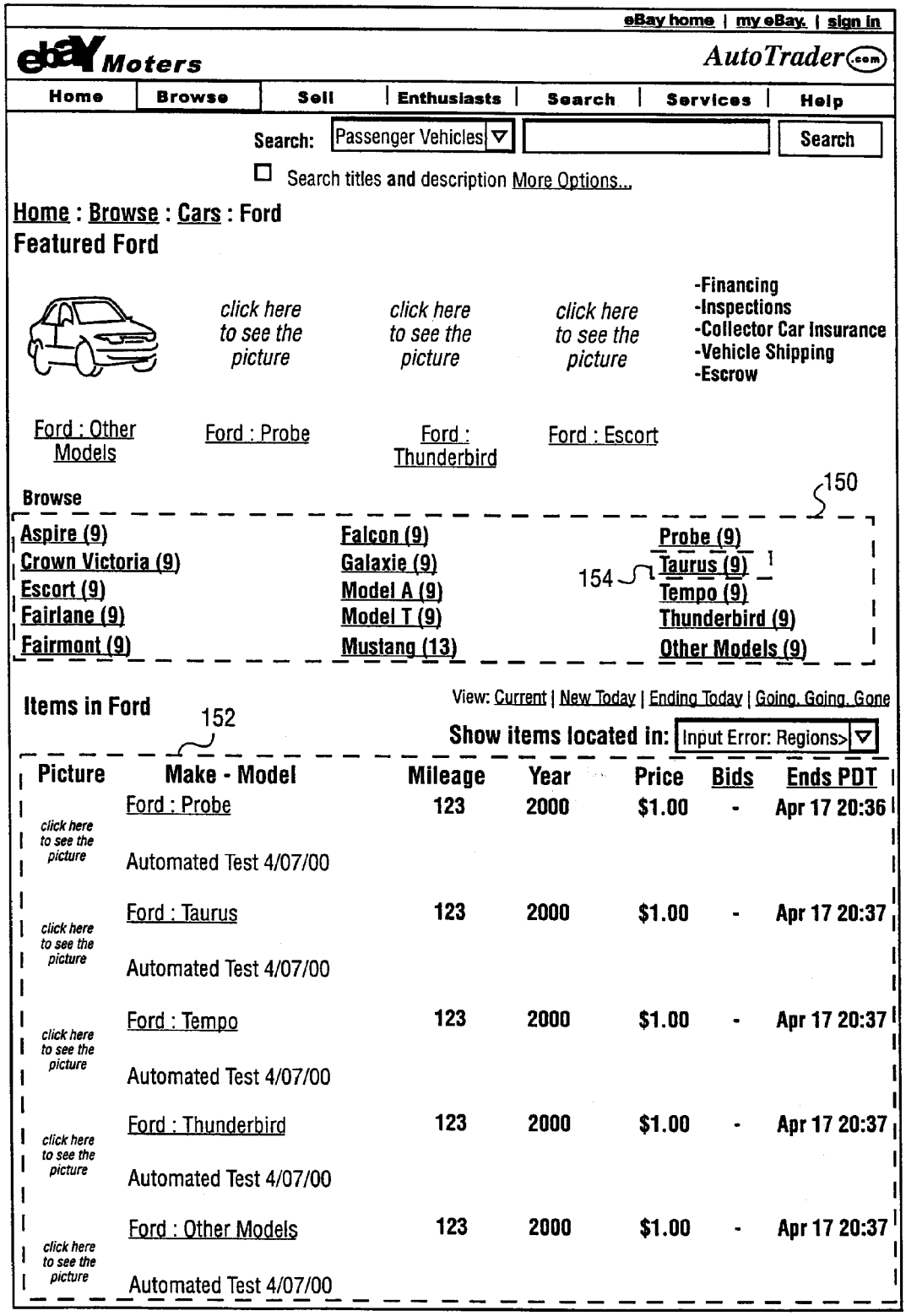
MG (0)
Mitsubishi (0)
Nissan (0)
Oldsmobile (0)
Opel (0)
Packard (0)
Peugot (0)
Plymouth (0)
Related Links
Enthusiast pages: Ford Mustang * Corvette * Harley Davidson * Muscle Cars
Related categories on eBay Motors: Automobilia * Parts & Accessories * Other Vehicles
Related categories on eBay: Diecast Toys * Vintage Toy Vehicles * Auto Advertising

FIG. 9B

144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Home
Browse
Sell
Enthusiasts
Search
Services
Help
Search: Passenger Vehicles
Search
Search titles and description More Options...
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click here to see the picture
click here to see the picture
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-Inspections
-Collector Car Insurance
-Vehicle Shipping
-Escrow
Ford : Other Models
Ford : Probe
Ford : Thunderbird
Ford : Escort
Browse
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Aspire (9)
Crown Victoria (9)
Escort (9)
Fairlane (9)
Fairmont (9)
Falcon (9)
Galaxie (9)
Model A (9)
Model T (9)
Mustang (13)
Probe (9)
Taurus (9)
Tempo (9)
Thunderbird (9)
Other Models (9)
154
Items in Ford
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Price
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Ford : Thunderbird
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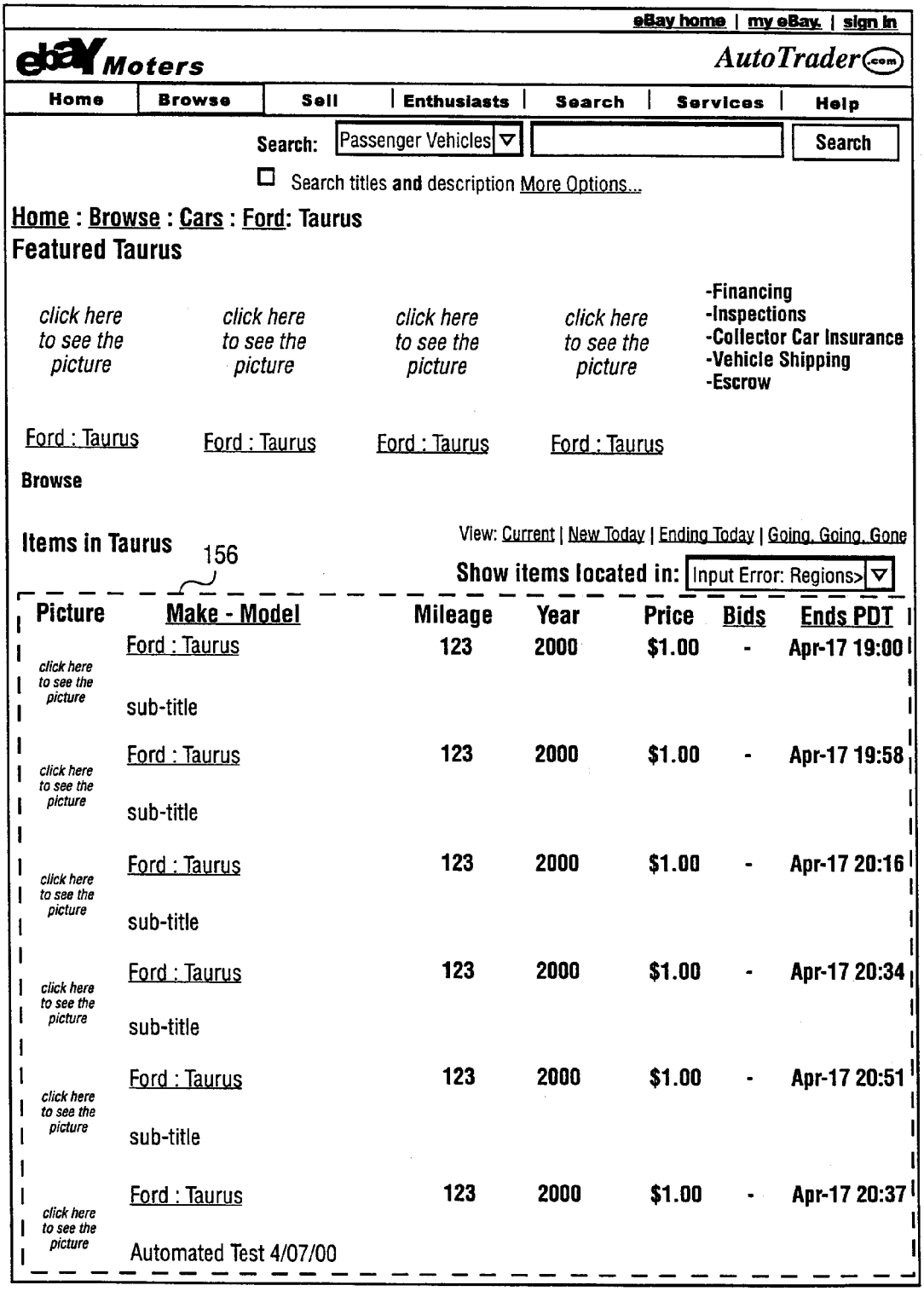
FIG. 9C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AutoTrader.com
Home | Browse | Sell | Enthusiasts | Search | Services | Help
Search: Passenger Vehicles
Search
Search titles and description More Options...
Home : Browse : Cars : Ford: Taurus
Featured Taurus
click here to see the picture
click here to see the picture
click here to see the picture
click here to see the picture
-Financing
-Inspections
-Collector Car Insurance
-Vehicle Shipping
-Escrow
Ford : Taurus
Ford : Taurus
Ford : Taurus
Ford : Taurus
Browse
Items in Taurus
156
View: Current | New Today | Ending Today | Going, Going, Gone
Show items located in: Input Error: Regions>
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Year
Price
Bids
Ends PDT
click here to see the picture
Ford : Taurus
123
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$1.00
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sub-title
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Automated Test 4/07/00

FIG. 9D

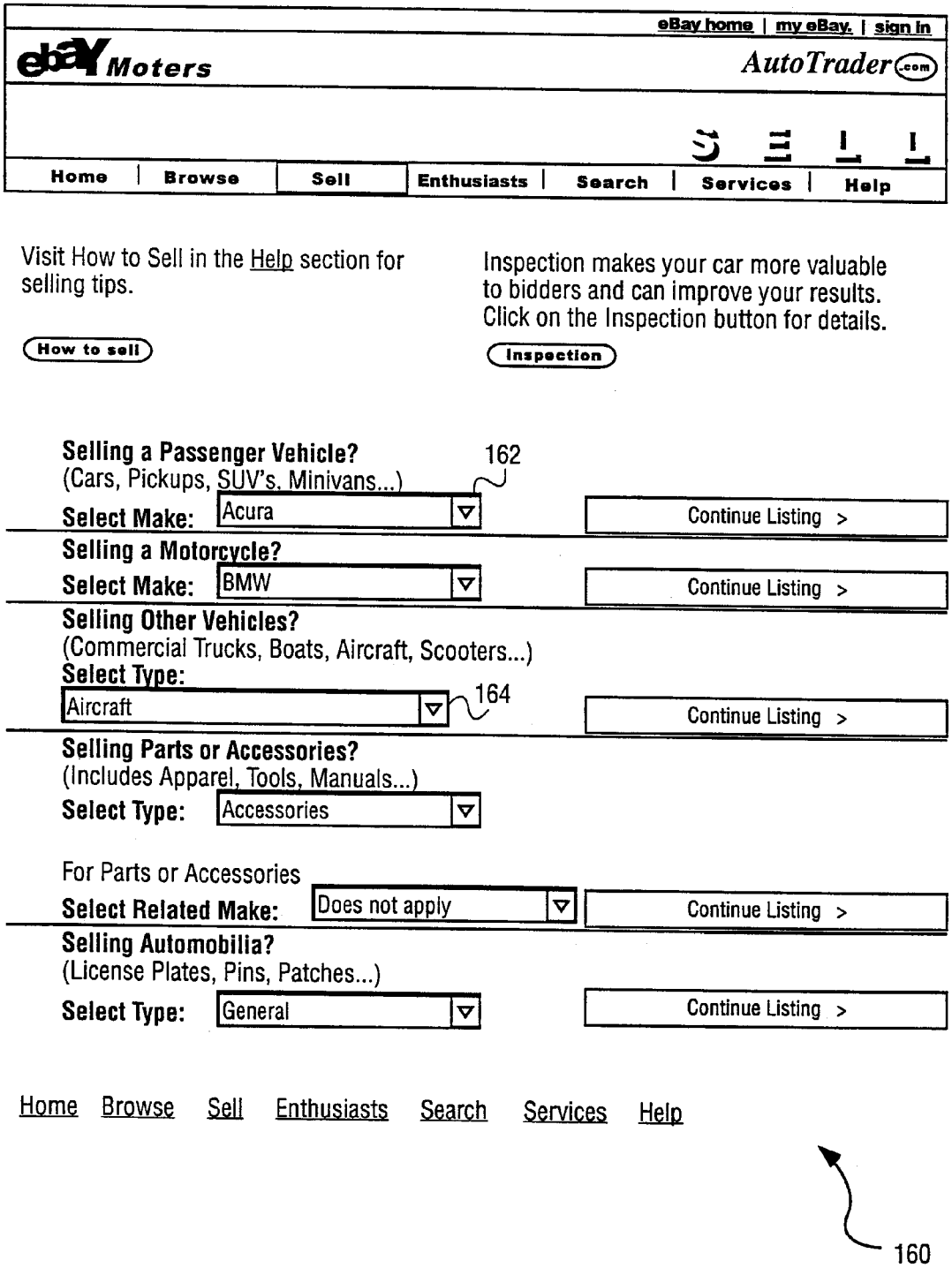
eBay home | my eBay. | sign in
eBay Motors
AutoTrader .com
SELL
Home | Browse | Sell | Enthusiasts | Search | Services | Help
Visit How to Sell in the Help section for selling tips.
How to sell
Inspection makes your car more valuable to bidders and can improve your results. Click on the Inspection button for details.
Inspection
Selling a Passenger Vehicle?
(Cars, Pickups, SUV's, Minivans...)
Select Make: Acura
162
Continue Listing >
Selling a Motorcycle?
Select Make: BMW
Continue Listing >
Selling Other Vehicles?
(Commercial Trucks, Boats, Aircraft, Scooters...)
Select Type:
Aircraft
164
Continue Listing >
Selling Parts or Accessories?
(Includes Apparel, Tools, Manuals...)
Select Type: Accessories
For Parts or Accessories
Select Related Make: Does not apply
Continue Listing >
Selling Automobilia?
(License Plates, Pins, Patches...)
Select Type: General
Continue Listing >
Home Browse Sell Enthusiasts Search Services Help
160

FIG. 10A

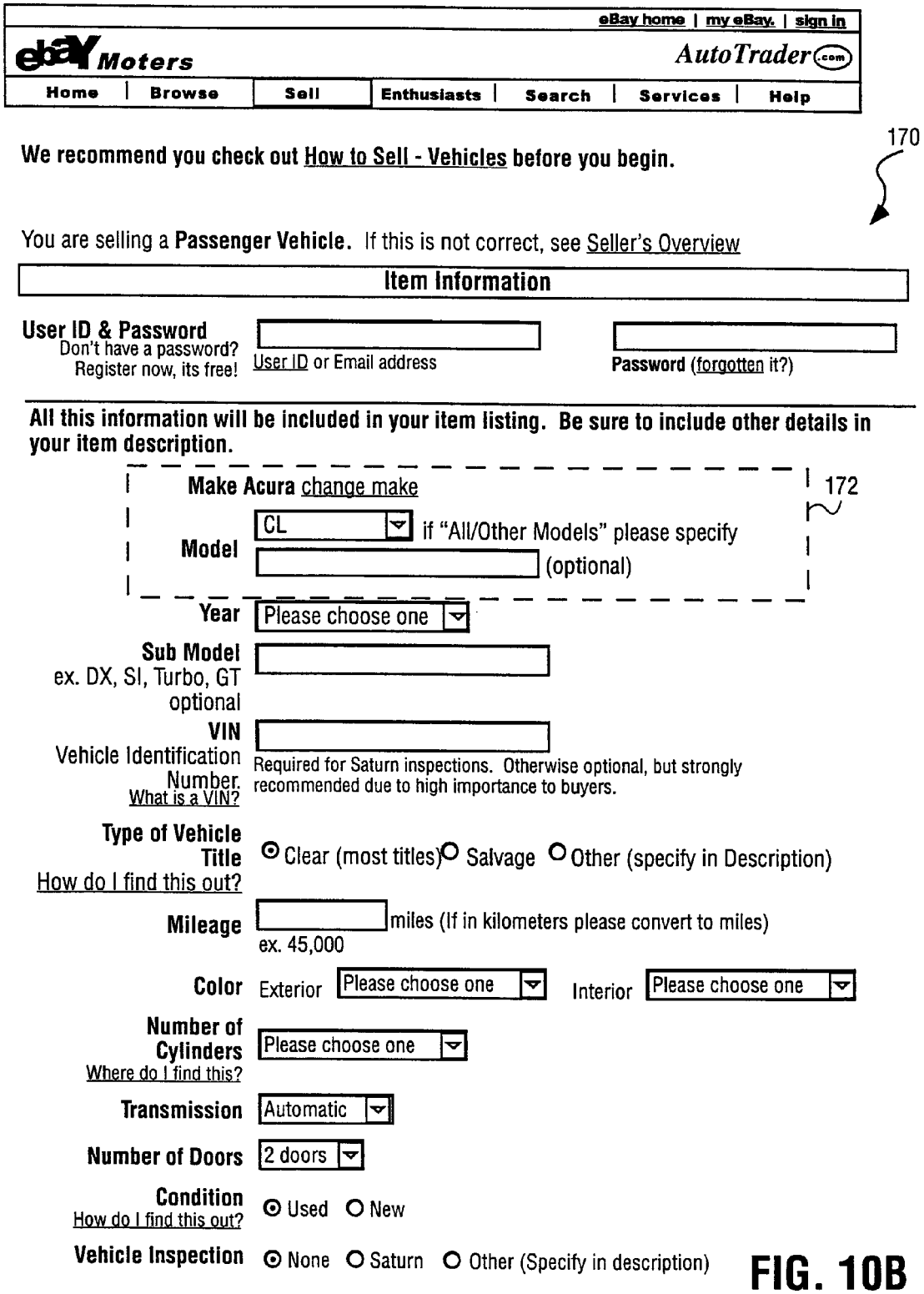
eBay home | my eBay | sign in
eBay Motors
AutoTrader.com
Home | Browse | Sell | Enthusiasts | Search | Services | Help
170
We recommend you check out How to Sell - Vehicles before you begin.
You are selling a Passenger Vehicle. If this is not correct, see Seller's Overview
Item Information
User ID & Password
Don't have a password? Register now, its free!
User ID or Email address
Password (forgotten it?)
All this information will be included in your item listing. Be sure to include other details in your item description.
172
Make Acura change make
Model
CL
if "All/Other Models" please specify
(optional)
Year
Please choose one
Sub Model
ex. DX, SI, Turbo, GT optional
VIN
Vehicle Identification Number.
What is a VIN?
Required for Saturn inspections. Otherwise optional, but strongly recommended due to high importance to buyers.
Type of Vehicle Title
How do I find this out?
Clear (most titles) Salvage Other (specify in Description)
Mileage
miles (If in kilometers please convert to miles)
ex. 45,000
Color
Exterior
Please choose one
Interior
Please choose one
Number of Cylinders
Where do I find this?
Please choose one
Transmission
Automatic
Number of Doors
2 doors
Condition
How do I find this out?
Used New
Vehicle Inspection
None Saturn Other (Specify in description)

FIG. 10B

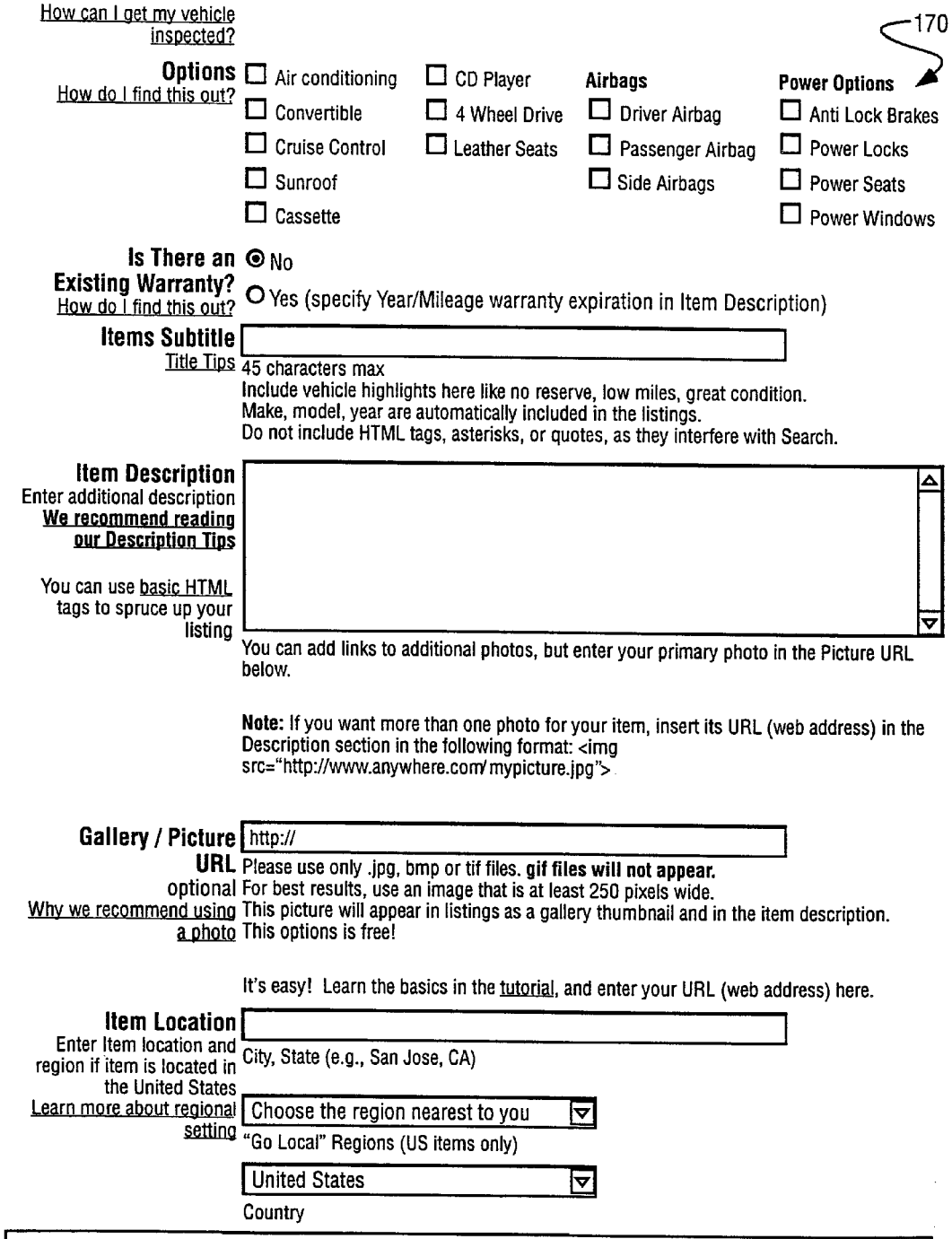
How can I get my vehicle inspected?
170
Options
How do I find this out?
Air conditioning
CD Player
Airbags
Power Options
Convertible
4 Wheel Drive
Driver Airbag
Anti Lock Brakes
Cruise Control
Leather Seats
Passenger Airbag
Power Locks
Sunroof
Side Airbags
Power Seats
Cassette
Power Windows
Is There an Existing Warranty?
How do I find this out?
No
Yes (specify Year/Mileage warranty expiration in Item Description)
Items Subtitle
Title Tips
45 characters max
Include vehicle highlights here like no reserve, low miles, great condition.
Make, model, year are automatically included in the listings.
Do not include HTML tags, asterisks, or quotes, as they interfere with Search.
Item Description
Enter additional description
We recommend reading our Description Tips
You can use basic HTML tags to spruce up your listing
You can add links to additional photos, but enter your primary photo in the Picture URL below.
Note: If you want more than one photo for your item, insert its URL (web address) in the Description section in the following format: <img src="http://www.anywhere.com/mypicture.jpg">
Gallery / Picture URL
optional
Why we recommend using a photo
http://
Please use only .jpg, bmp or tif files. gif files will not appear.
For best results, use an image that is at least 250 pixels wide.
This picture will appear in listings as a gallery thumbnail and in the item description.
This options is free!
It's easy! Learn the basics in the tutorial, and enter your URL (web address) here.
Item Location
Enter Item location and region if item is located in the United States
Learn more about regional setting
City, State (e.g., San Jose, CA)
Choose the region nearest to you
"Go Local" Regions (US items only)
United States
Country
Make your item stand out and get more bids! Try these winning options.

FIG. 10C

eBay Featured Details ☐ $99.95 charge

Gallery Featured Details ☐ $99.95 charge

Category Featured Details ☐ $14.95 charge

Boldface Title Details ☐ $4.00 charge

Listing Icon Details $2.00 charge
◉ No Icon ○ [US Flag] ○ [Checkered Flag] ○ [4X4] ○ [Gift] ○ [Graduation]

170

Auction Information

Payment Methods
Choose all that you will accept. Enter specific payment information Item Description
☐ Money Order/Cashiers Check ☐ Personal Check ☐ Visa/MasterCard
☐ COD (collect on delivery) ☐ Discover ☐ American Express
☑ See Item Description ☐ Other

Escrow learn more
○ I will accept escrow, buyer pays (recommended)
○ I will pay for escrow
◉ I will not accept escrow (if selected, the Escrow section will not appear on the item listing)

Where Will You Ship Your Vehicle? See tips on shipping
◉ Will ship to United States only
○ Will ship internationally (worldwide)
○ Will ship to United States and the following regions: (Check all that apply)
- ☐ Canada
- ☐ Europe
- ☐ Australasia
- ☐ Asia
- ☐ South America
- ☐ Africa
- ☐ Mexico and Central America
- ☐ Middle East
- ☐ Caribbean

○ Will not ship

Who Pays For Shipping?
☐ Seller Pays Shipping ☐ Buyer Pays Fixed Amount.
☐ Buyer Pays Actual Shipping Cost ☑ See Item Description

Starting Bid See tips on setting starting bid amounts
[ ]
(e.g., 2.00 - Please do not include commas or currency symbols, such as $.)

FIG. 10D

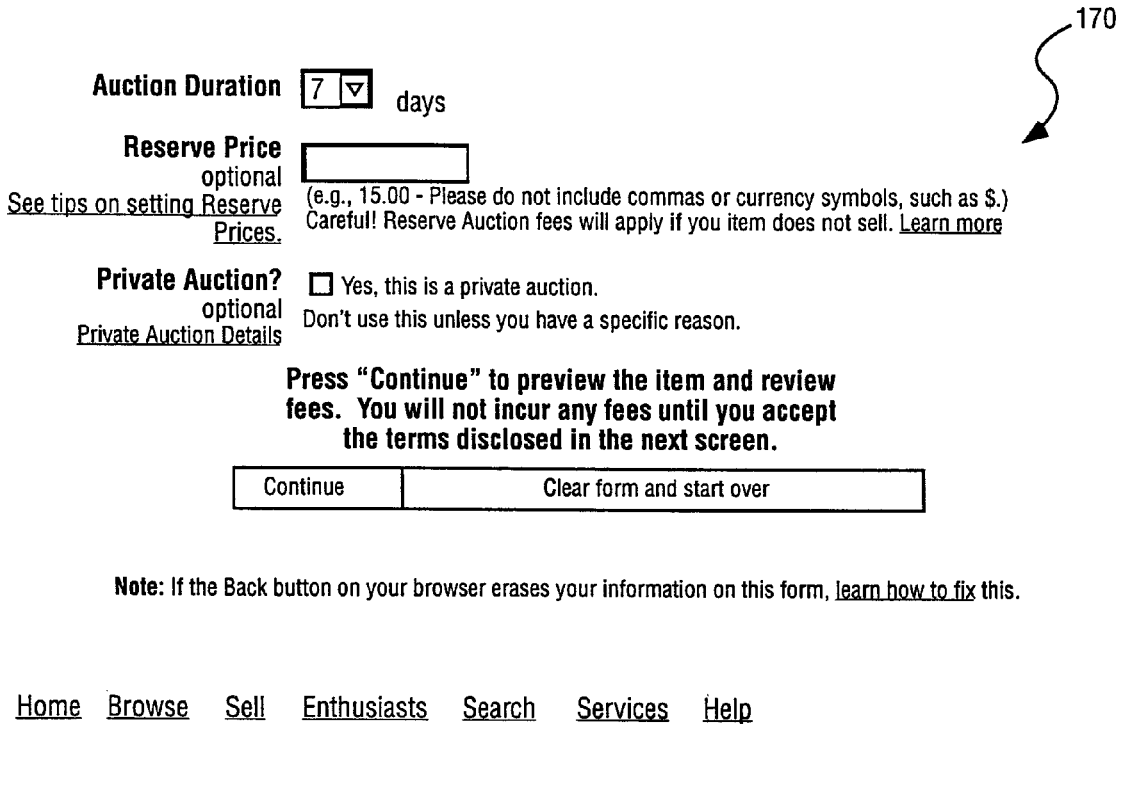
170
Auction Duration
7
days
Reserve Price
optional
See tips on setting Reserve Prices.
(e.g., 15.00 - Please do not include commas or currency symbols, such as $.)
Careful! Reserve Auction fees will apply if you item does not sell. Learn more
Private Auction?
optional
Private Auction Details
Yes, this is a private auction.
Don't use this unless you have a specific reason.
Press "Continue" to preview the item and review fees. You will not incur any fees until you accept the terms disclosed in the next screen.
Continue
Clear form and start over
Note: If the Back button on your browser erases your information on this form, learn how to fix this.
Home Browse Sell Enthusiasts Search Services Help

FIG. 10E

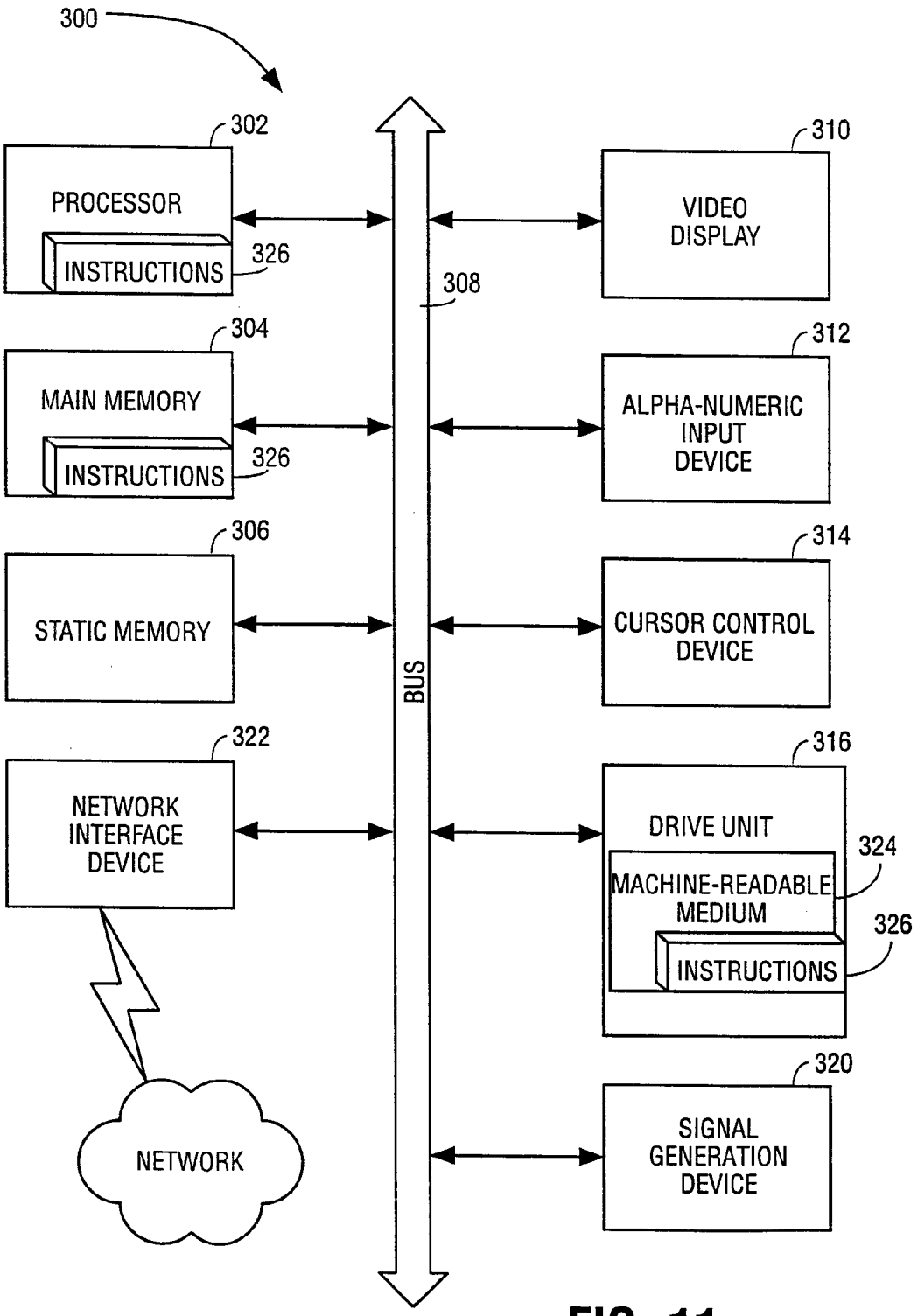
300
302
PROCESSOR
INSTRUCTIONS
326
304
MAIN MEMORY
INSTRUCTIONS
326
306
STATIC MEMORY
322
NETWORK INTERFACE DEVICE
NETWORK
BUS
308
310
VIDEO DISPLAY
312
ALPHA-NUMERIC INPUT DEVICE
314
CURSOR CONTROL DEVICE
316
DRIVE UNIT
MACHINE-READABLE MEDIUM
324
INSTRUCTIONS
326
320
SIGNAL GENERATION DEVICE

FIG. 11

METHOD AND SYSTEM FOR CATEGORIZING ITEMS IN BOTH ACTUAL AND VIRTUAL CATEGORIES

The present application is a continuation of U.S. application Ser. No. 13/343,589, which is a continuation of application filed on Jan. 4, 2012, which claims priority from U.S. application Ser. No. 12/416,081, which is a continuation of application filed on Mar. 21, 2009, which claims priority from U.S. application Ser. No. 09/733,767, filed on Dec. 8, 2000, which claims priority from U.S. provisional patent application No. 60/199,731 entitled "Method and System for Categorizing Items in Both Actual and Virtual Categories" filed Apr. 24, 2000 all of which are incorporated herein by reference in entirety.

FIELD OF THE INVENTION

The present invention relates generally to the field of database architecture and, more specifically, to the categorizing of database items in both an actual category and a virtual category.

BACKGROUND OF THE INVENTION

Web sites, or other network-based data aggregators or presenters, commonly use category schemas to provide context and structure for data items. For example, within an on-line web site directory, such as that presented by Yahoo! Incorporated of Santa Clara, Calif., web sites are commonly classified under an extensive category schema.

Within commercial web sites, product or service offerings are also commonly classified under a category schema so as to enable convenient user navigation of offerings to locate offerings of interest. For example, eBay, Incorporated of San Jose, Calif., implements an extensive categorization schema for an on-line auction service. Specifically, a seller wishing to post an item for auction on the on-line auction facility is required to specify a category for the relevant product offering.

BRIEF DESCRIPTION OF THE DRAWINGS

The present invention is illustrated by way of example and not limitation in the figures of the accompanying drawings, in which like references indicate similar elements and in which:

FIG. **1** is a block diagram illustrating an exemplary network-based transaction facility in the form of an internet-based auction facility **10**.

FIG. **2** is a database diagram illustrating an exemplary database, maintained and accessed via a database engine server, which at least partially implements and supports the auction facility.

FIG. **3** is a representation of an item table, according to an exemplary embodiment of the present invention, that may include a category identifier corresponding to an identifier of one or more real categories defined within a category table of the database.

FIG. **4** is a diagrammatic representation of an exemplary category table, and of an exemplary category class, that may be instantiated as objects that reference a category table.

FIG. **5** is a diagrammatic representation of an exemplary populated category table, which is populated with exemplary records from both an actual category as well as two virtual categories.

FIG. **6** is a conceptual diagram illustrating a view of selected actual categories and virtual categories within an exemplary database, as defined within one or more exemplary category tables.

FIG. **7** is a flow chart illustrating a method, according to an exemplary embodiment of the present invention, of constructing a category structure within a database.

FIG. **8** is a flow chart detailing a method, according to an exemplary embodiment of the present invention, of facilitating the location of a data item by navigation of a hierarchy of virtual categories.

FIG. **9**A provides an example of a markup language document that lists a number of top-level virtual categories.

FIG. **9**B illustrates an example of a markup language document that may present an exemplary list of mixed-level categories.

FIG. **9**C is an example of a markup language document that may be utilized to present both next level, or leaf, categories and data items identified to a user.

FIG. **9**D is an example of a markup language document that may be utilized to present both next level, or leaf, categories and data items identified to a user.

FIG. **9**D is an example of a markup language document that may be utilized to present a narrowed list of data items.

FIG. **10**A shows an exemplary user interface, in the form of a markup language document, that facilitates classification by a user of a data item according to actual categories.

FIGS. **10**B-**10**E illustrate a further interface via which a user may specify actual category information.

FIG. **11** is a diagrammatic representation of a machine, in the exemplary form of a computer system, within which a set of instructions for causing the machine to perform any of the methodologies discussed above may be executed.

DETAILED DESCRIPTION

A method and system for categorizing items in both actual and virtual categories are described. In the following description, for purposes of explanation, numerous specific details are set forth in order to provide a thorough understanding of the present invention. It will be evident, however, to one skilled in the art that the present invention may be practiced without these specific details.

Terminology

For the purposes of the present specification, the term "transaction" shall be taken to include any communications between two or more entities and shall be construed to include, but not be limited to, commercial transactions including sale and purchase transactions, auctions and the like.

The term "virtual category" shall be understood to be a category that, for a particular data item, is not directly recorded as being associated with the data item. Nonetheless, a "virtual category" may, for a further data item, be directly recorded as an appropriate category, and for such a further data item will comprise an "actual category" (or a "real category").

Transaction Facility

FIG. **1** is block diagram illustrating an exemplary network-based transaction facility in the form of an Internet-based auction facility **10**. While an exemplary embodiment of the present invention is described within the context of an auction facility, it will be appreciated by those skilled in the art that the invention will find application in many different types of computer-based, and network-based, commerce facilities.

The auction facility **10** includes one or more of a number of types of front-end servers, namely page servers **12** that deliver

web pages (e.g., markup language documents), picture servers **14** that dynamically deliver images to be displayed within Web pages, listing servers **16**, CGI servers **18** that provide an intelligent interface to the back-end of facility **10**, and search servers **20** that handle search requests to the facility **10**. E-mail servers **21** provide, inter alia, automated e-mail communications to users of the facility **10**.

The back-end servers include a database engine server **22**, a search index server **24** and a credit card database server **26**, each of which maintains and facilitates access to a respective database.

The Internet-based auction facility **10** may be accessed by a client program **30**, such as a browser (e.g., the Internet Explorer distributed by Microsoft Corp. of Redmond, Wash.) that executes on a client machine **32** and accesses the facility **10** via a network such as, for example, the Internet **34**. Other examples of networks that a client may utilize to access the auction facility **10** include a wide area network (WAN), a local area network (LAN), a wireless network (e.g., a cellular network), or the Plain Old Telephone Service (POTS) network.

Database Structure

FIG. **2** is a database diagram illustrating an exemplary database **23**, maintain by and accessed via the database engine server **22**, which at least partially implements and supports the auction facility **10**. The database **23** may, in one embodiment, be implemented as a relational database, and includes a number of tables having entries, or records, that are linked by indices and keys. In an alternative embodiment, the database **23** may be implemented as collection of objects in an object-oriented database.

Central to the database **23** is a user table **40**, which contains a record for each user of the auction facility **10**. A user may operate as a seller, buyer, or both, within the auction facility **10**. The database **23** also includes item tables **42** that may be linked to the user table **40**. Specifically, the tables **42** include a seller items table **44** and a bidder items table **46**. A user record in the user table **40** may be linked to multiple items that are being, or have been, auctioned via the facility **10**. A link indicates whether the user is a seller or a bidder (or buyer) with respect to items for which records exist within the item tables **42**.

The database **23** also includes one or more category tables **47**. Each record within the category table **47** describes a respective category. In one embodiment, a specific category table **47** may describe multiple, hierarchical category structures, and include multiple category records, each of which may describe the context of a particular category within the one of the multiple hierarchical category structures. For example, the category table **47** may describe a number of real, or actual, categories to which item records, within the item tables **42**, may be linked. For example, as shown in FIG. **3**, an item table **42** may include a category identifier **62** corresponding to an identifier of one or more real categories defined within the category table **47**.

The category table **47** may also define a number of "virtual" hierarchical category structures that support alternative navigation paths that may be presented to a user to locate a particular item. In one embodiment, categories of a "virtual" hierarchical category structure are not directly referenced within item records within the item tables **42**, but are instead linked to "real" categories. Accordingly, in one embodiment, no category identifiers **62** within the item tables **42** point directly to a "virtual" category. As will be described in further detail below, multiple virtual categories may be linked to a single real category.

The database **23** also includes a note table **48** populated with note records that may be linked to one or more item records within the item tables **42** and/or to one or more user records within the user table **40**. Each note record within the table **48** may include, inter alia, a comment, description, history or other information pertaining to an item being auction via the auction facility **10**, or to a user of the auction facility **10**.

A number of other tables are also shown to be linked to the user table **40**, namely a user past aliases table **50**, a feedback table **52**, a feedback details table **53**, a bids table **54**, an accounts table **56**, an account balances table **58** and a transaction record table **60**.

Category Table and Hierarchical Category Structures

FIG. **4** is a diagrammatic representation of an exemplary category table **47**, and of an exemplary category class **70** that may be instantiated as objects that reference the category table **47**.

The category table **47** is shown to include a number of fields, each of which may be populated with relevant information for a category record within the category table **47**. For each category record, a marketplace field **68** indicates a particular marketplace (e.g., automobiles, computers, collectibles, etc.) within the context of the network-based auction facility **10** to which the category pertains. An identifier field **72** contains a unique category identifier for each category record. A name field **74** similarly includes a name (which need not be unique) for the relevant category.

An IS_LEAF field **76**, for each category record, is populated with a character that indicates whether the relevant category is a leaf category of a particular hierarchical category structure (e.g., an actual or virtual category structure). The level1-level4 fields **78-84** record the category identifiers of categories from which a particular category depends within the context of hierarchical category structure. For example, the level1 field **78** will record the category identifier for an immediate parent category, while the level2 field **80** will record the category identifier for a grandparent category.

An actual_category field **86** is, in one embodiment, only populated for a virtual category, and stores the category identifier of an actual (or real) category to which the relevant virtual category is linked.

FIG. **5** is a diagrammatic representation of an exemplary populated category table **47**, that is populated with exemplary records for both an actual category **90**, as well as two virtual categories **92** and **94**.

Turning first to the hierarchy of actual categories **90**, a parent (passenger vehicle) category includes a "Ford" child category, the "Ford" category being indicated as a child of the "passenger car" category by inclusion of the category identifier (e.g., **50**) within the level1 field **78** of the record for the "Ford" category. The "Ford" category in turn is shown to include a "Taurus" sub-category and a "Model T" sub-category. It will be noted the "Taurus" and the "Model T" categories are indicated in the IS-LEAF field **76** as being leaf categories of the hierarchy of actual categories **90**. It will furthermore be noted that, for each category within the hierarchy of actual categories **90**, the actual_category field **86** contains a null value, as these categories are not linked to, and do not point to, further categories.

Turning now to the hierarchy of virtual categories **92**, a parent "cars" category is defined to have a "Ford" child cat-

egory, that in turn is defined to have a "Taurus" child category. It will be noted that the level1 field **78** of the "Ford" category includes an identifier pointing back to the parent "cars" category.

The "Taurus" category of the virtual categories **92** is also shown, within the actual_category field **86**, to include the identifier of the "Taurus" category of the actual categories **90**. In this way, the virtual "Taurus" category, identified by the category identifier "8001" is linked to, or points to, the actual "Taurus" category identified by the category identifier "8000". In this way, user navigation of the hierarchy of virtual categories **92**, when resulting in the selection of the virtual "Taurus" category, can be utilized to identify the category identifier for an actual "Taurus" category, that can in turn be utilized to identify records within an item table **42**.

Similarly, the hierarchy of virtual categories **94** is headed by a "vintage cars" category that includes a child "Ford" category and a grandchild "Model T" category. The "Model T" category is again linked, by an appropriate category identifier within the actual_category field **86**, to the actual "Model T" category of the actual categories **90**.

It will furthermore be noted that, in one embodiment, only real categories are indicated in the IS_LEAF field **76** as being leaf categories.

In one embodiment of the present invention, as mentioned above, data items may only be categorized under a hierarchy of actual categories **90**, and not under a hierarchy of virtual categories. It is for this reason that only actual categories may be indicated as leaf categories.

While the hierarchies of virtual categories **92** and **94** are indicated as being distinct hierarchies, these hierarchies may in fact be sub-hierarchies of a larger hierarchy of virtual categories. Nonetheless, the present application contemplates that the category table **47** may define multiple hierarchies of virtual categories, and that multiple virtual categories may be linked to, or pointed to, a single actual category.

FIG. **6** is a conceptual diagram illustrating a view of selected actual categories **100** and virtual categories **102** within an exemplary database, and as defined within one or more exemplary category tables **47**. As illustrated, both the actual categories **100** and the virtual categories **102** are shown to include parent, child and grandchild categories. The grandchild categories, in the illustrated example, are "leaf" categories for both the actual and virtual categories **100** and **102**. Leaf categories of the virtual categories are shown to be linked to appropriate "leaf" categories of the actual categories **100**.

Methodologies

FIG. **7** is a flow chart illustrating a method **110**, according to an exemplary embodiment of the present invention, of constructing category structures within a database. The database may, in one exemplary embodiment, support a web site that classifies data items for presentation to a user via a browser. Such data items may describe, for example, web sites, products, services or any other items that may be categorized so as to facilitate convenient location by a user. In one embodiment, the data items may describe goods and services that are offered for sale via an auction process by the network-based auction facility **10**. However, it will readily be appreciated that the present invention is not limited to use in such an exemplary facility.

The method **110** commences at block **112** with the definition, for example by a database designer, of a hierarchy of "actual" categories **100** being described by a respective category records that each specify a category identifier.

At block **114**, the database designer then defines at least one hierarchy and multiple hierarchies, of "virtual" categories **102** within the category table **47**. In one embodiment, the virtual categories are not intended to be presented to a user for selection to categorize a data item, but are linked, in the manner described above, to actual categories.

At block **116**, in an actual_category field **86** for each "leaf" virtual category, the database designer includes a pointer (or link) in the form of a category identifier to a "actual" leaf category.

FIG. **8** is a flow chart detailing a method **120**, according to an exemplary embodiment of the present invention, of facilitating the location of a data item by navigation of a hierarchy of virtual categories.

The method **120** commences at block **122**, with the presentation to a user of a list of top-level virtual categories. For example, the top-level categories may be the parent categories of the virtual categories **102** illustrated in FIG. **6**. The top-level categories may furthermore be presented in the form of a markup language document (e.g., a HTML document) that is generated by a page server **12** utilizing category information retrieved by the database engine server **22** from the database **23**. FIG. **9**A provides an example of such a markup language document **138**, which lists a number of top-level virtual categories **140**.

At block **124**, user selection of a virtual category is detected. For example, by performing a "point-and-click" operation utilizing a cursor control device, a user may select the "cars" category of the virtual categories **140** shown in FIG. **9**A, the selection being communicated to a CGI server **18** that in turn communicates the selection to an appropriate CGI script.

At block **126**, a list of next-level virtual category is presented, based on the virtual category selected at block **124**. FIG. **9**B illustrates an example of a markup language document that may be utilized to present an exemplary list **144** of such mixed-level categories. For example, a CGI script executing within a CGI server **18** and responsive to identification of a user-selected top-level category, may, via the database engine server **22**, query the category table **47** to identify virtual categories that are child categories of the "cars" category. The results of this query are then communicated to a page server **12** that populates a template to generate the markup language document illustrated in FIG. **9**B. The list **144** of virtual categories shown in FIG. **9**B accordingly represents child categories of the "cars" virtual category.

At block **128**, a user selection of a next-level virtual category is detected, in the same manner described above. For example, assuming user selection of a hypertext link **146** for the "Ford" category of the list **144** of categories shown in FIG. **9**B, this user selection may be communicated to a CGI server **18**.

At block **130**, a leaf category, or leaf categories, of the virtual category selected at block **128** may, in one embodiment, be identified so as to facilitate presentation of all data items associated with that leaf category or categories. For example, all leaf categories that depend from the virtual "Ford" category selected at block **128** may be identified. Such leaf categories may include the virtual "Taurus" category or the virtual "Model T" category discussed above with reference to FIG. **5**.

Where the category selected at block **128** itself comprises a leaf category, it will be appreciated that such a category itself be identified as the leaf category at block **130**.

At block **132**, a mapping, or linking, operation is performed so as to map the relevant virtual leaf categories identified at block **130** to actual leaf categories. Specifically, as

described above, this mapping operation may be performed utilizing a category identifier included within the actual_category field **86** of each relevant virtual category.

Having then identified one or more actual leaf categories corresponding to the virtual leaf categories, at block **134**, data items categorized as being attributed to the identified real leaf categories are identified and presented in a user interface.

FIG. **9**C is an exemplary embodiment of a user interface, in the form of a markup language document, that may be utilized to present both the next level, or leaf, categories identified at block **130** and the data items identified at block **134** to a user. Specifically, the next level virtual categories are shown to be presented at **150**, and the identified data items are shown to be presented at **152**. It will be noted that the data items presented at **152** include data items within all of the virtual leaf categories listed at **150**. Accordingly, the list of data items **152** may be extensive. For this reason, a user may wish to further navigate the hierarchy of virtual categories to further limit the list of data items **152** to a more manageable size.

Returning to FIG. **8**, at decision block **136**, a determination is made as to whether a user selected a virtual leaf category at block **128**. If the selected virtual category is not a leaf category, the method **120** loops back through blocks **126-134**. For example, a user may select a hypertext link **154** for the virtual "Taurus" category, responsive to which the user will be presented, at block **134**, with a list of data items identified as being within the actual "Taurus" category by performing a link between the virtual "Taurus" category and the actual "Taurus" category.

FIG. **9**D is an exemplary user interface, in the form of a markup language document, that illustrates the presenting of such a narrowed list of data items at **156**. It will furthermore be noted that the user interface shown in FIG. **9**D does not provide a list of any child categories, as were shown at **150** in FIG. **9**C, as the virtual "Taurus" category is a leaf category.

User-Classification of a Data Item—User Interfaces

As described above, in one embodiment, a user (e.g., a seller) utilizing the network-based auction facility **10** or an administrator classifying data items for presentation via a web site, may be presented with the option of only classifying data items within the context of a hierarchy of actual (and not virtual) categories.

FIG. **10**A shows an exemplary user interface, in the form of a markup language document, that facilitates classification by a user of a data item according to actual categories **100**, such as those shown in FIG. **6**. The top-level (or parent) actual categories comprise vehicle types (e.g., a passenger vehicles, commercial trucks, boats, aircraft, etc.). Selection of a passenger vehicle type utilizing a drop-down menu **162** indicates both an actual parent category and an actual child category. Alternatively, the user (i.e., seller) may be offering a further vehicle type for auction. User selection of the drop-down menu **164** allows the seller to specify such a further vehicle type.

FIGS. **10**B-**10**E illustrates a further user interface **170** via which a user (i.e., a seller) may specify actual category information. In an exemplary embodiment, the information inputted by the user at block **172**, as shown in FIG. **10**B, specifies an actual category. Specifically, for passenger vehicles, a leaf category is defined by a passenger vehicle make and model.

It should thus be noted that, in the exemplary embodiment, data items are classified according to a selected leaf category. Such leaf categories may be viewed as a category path selected within the context of a hierarchy of categories. For example, the full categorization of a data item may be viewed as the "passenger vehicle/Ford/Taurus" categorization.

Software

The methodologies described above may, it will be appreciated, be performed by software modules residing and executing on a wide variety of machines. In one embodiment, the mapping of the virtual leaf categories to actual leaf categories may be performed by a "listings produce" module or object that issues a series of SQL statements against the database **23**. The "listings produce" object may reside, for example, on a CGI server **18** or be part of the database engine server **22**.

FIG. **11** shows a diagrammatic representation of a machine in the exemplary form of a computer system **300** within which a set of instructions, for causing the machine to perform any one of the methodologies discussed above, may be executed. In alternative embodiments, the machine may comprise a network router, a network switch, a network bridge, Personal Digital Assistant (PDA), a cellular telephone, a web appliance or any machine capable of executing a sequence of instructions that specify actions to be taken by that machine.

The computer system **300** includes a processor **302**, a main memory **304** and a static memory **306**, which communicate with each other via a bus **308**. The computer system **300** may further include a video display unit **310** (e.g., a liquid crystal display (LCD) or a cathode ray tube (CRT)). The computer system **300** also includes an alpha-numeric input device **312** (e.g. a keyboard), a cursor control device **314** (e.g. a mouse), a disk drive unit **316**, a signal generation device **320** (e.g. a speaker) and a network interface device **322**

The disk drive unit **316** includes a machine-readable medium **324** on which is stored a set of instructions (i.e., software) **326** embodying any one, or all, of the methodologies described above. The software **326** is also shown to reside, completely or at least partially, within the main memory **304** and/or within the processor **302**. The software **326** may further be transmitted or received via the network interface device **322**. For the purposes of this specification, the term "machine-readable medium" shall be taken to include any medium that is capable of storing or encoding a sequence of instructions for execution by the machine and that cause the machine to perform any one of the methodologies of the present invention. The term "machine-readable medium" shall accordingly be taken to included, but not be limited to, solid-state memories, optical and magnetic disks, and carrier wave signals.

Thus, a method and system for categorizing items in both actual and virtual categories have been described. Although the present invention has been described with reference to specific exemplary embodiments, it will be evident that various modifications and changes may be made to these embodiments without departing from the broader spirit and scope of the invention. Accordingly, the specification and drawings are to be regarded in an illustrative rather than a restrictive sense.

What is claimed is:

1. A method of identifying and presenting a plurality of data items, the method including:

receiving a selection that identifies a parent category;

identifying a first category based on the parent category, the first category is a first leaf category;

identifying the plurality of data items based on a link from the first category to a second category, the second category is a second leaf category that corresponds to the first leaf category, the data items are not user-classifiable under the first category and are user-classifiable under

the second category, the identifying done at least in part through the use of one or more processors; and

communicating, over a network, a user interface responsive to the receiving the selection, the user interface including the plurality of data items.

2. The method of claim **1**, wherein the first leaf category is a virtual leaf category.

3. The method of claim **1**, wherein the second leaf category is an actual leaf category.

4. The method of claim **1**, wherein the data items are directly categorized as being within the second category and indirectly categorized within the first category.

5. The method of claim **1**, wherein the first and second categories are defined in a category table including a plurality of category records, wherein the plurality of category records include a category record for each category of the first and second categories.

6. The method of claim **5**, wherein each category record within the category table includes a category identifier.

7. The method of claim **6**, wherein a category record that describes the first category includes the link.

8. The method of claim **7**, wherein the link includes a category identifier of a category record for the second category.

9. The method of claim **1**, wherein the plurality of data items includes a data item, wherein the data item is a database record describing any one of a group consisting of products and services of a transaction facilitated by a network-based transaction facility.

10. The method of claim **1**, wherein the user interface includes the first plurality of categories.

11. A system to identify and present a plurality of data items, the system includes:

a server; and

a database that stores the plurality of data items, the server to receive a selection that identifies a parent category, the server to identify a first category based on the parent category, the first category is a first leaf category, the server to identify the plurality of data items based on a link from the first category to a second category, the second category is a second leaf category that corresponds to the first leaf category, the data items are not user-classifiable under the first category and are user-classified under the second category, the server to communicate, over a network, a user interface in response to receipt of the selection, the user interface includes the plurality of data items.

12. The system of claim **11**, wherein the first leaf category is a virtual leaf category.

13. The system of claim **11**, wherein the second leaf category is an actual leaf category.

14. The system of claim **11**, wherein the data items are directly categorized as being within the second category and indirectly categorized within the first category.

15. The system of claim **11**, wherein the first and second categories are defined in a category table including a plurality of category records, wherein the plurality of category records include a category record for each category of the first and second categories.

16. The system of claim **15**, wherein each category record within the category table includes a category identifier.

17. The system of claim **16**, wherein a category record that describes the first category includes the link, wherein the link includes a category identifier of a category record for the second category.

18. The system of claim **11**, wherein the plurality of data items includes a data item, wherein the data item is a database record describing any one of a group consisting of products and services of a transaction facilitated by a network-based transaction facility.

19. The system of claim **11**, wherein the user interface includes the first category.

20. A non-transitory machine-readable medium storing a sequence of instructions that, when executed by a machine, cause the machine to perform actions comprising:

receiving a selection that identifies a parent category;

identifying a first category based on the parent category, the first category is a first leaf category;

identifying a plurality of data items based on a link from the first category to a second category, the second category is a second leaf category that corresponds to the first leaf category, the data items are not user-classifiable under the first category and are user-classified under the second category; and

communicating, over a network, a user interface in response to the receipt of the selection, the user interface includes the plurality of data items.

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